

Trigger fish (*Balistes capriscus*). 1.

Studies on traditional processing

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SUMMARY

The traditional methods of processing Trigger fish (*Balistes capriscus*) along the southern coast of Ghana has been studied and reported. The proximate composition of samples of fish from the various processing centres is also provided. The results indicate that there is need for standardisation of the methods of processing in order to guarantee a uniform product quality.

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RÉSUMÉ

NERQUAYE-TETTEH, GLADYS : *Le poisson trigger* (*Balistes capriscus*). 1, *Etude de la préparation traditionnelle*. Les méthodes traditionnelles de préparation du poisson trigger (*Balistes capriscus*) en usage le long de la côte méridionale du Ghana ont été étudiées et exposées dans le présent travail. La composition approximative d'échantillons du poisson provenant de divers centres de préparation est également indiquée. Ces résultats montrent la nécessité d'une standardization des méthodes de préparation afin de garantir un produit de qualité uniforme.

Introduction

Various methods of salting fish, in particular, on cottage level have been reported. Jarvis (1950) reported on curing of fishery products. Van Veen (1953) also reported on the salting of fish in the South-East Asia. Beathie & Fougère (1957) also gave account of the processing of dried salted fish. Murray (1970) reported on how salting of cod, pickling and klondyking is carried out in Britain. In all these methods, dry salting appears to be a common feature and variations in quantities of salt used were related to the type of fish and the product desired.

Very little information is available in the literature on methods of salting Trigger fish, which is assuming increasing importance on the Ghanaian market. This work, therefore, examines the traditional methods of Trigger fish salting along the southern coast of Ghana, and the proximate composition of such fish in order to assess the quality of the product.

Materials and methods

Information on the traditional processing of Trigger fish was collected through a survey organised in the Central Region. The areas covered included Winneba, Apam, Mumford, Elmina, Takoradi and Shama where Trigger fish forms a larger bulk of the landings of the fisher folk.

The proximate analysis was determined on samples bought from the processing sites at Elmina and the parameters investigated included moisture, protein, ash, calcium, phosphorus, iron, and salt.

Traditional methods of processing

An open space, usually near the beach, is acquired by a group of women and used communally for salting. Such groups may comprise 2-5 processors. Crude solar salt is used.

When Trigger fish is landed, it is gutted manually by making a cut in the belly and withdrawing the contents of the belly. The gills are, however, not removed (Fig.1). The importance of this quick degutting practice is to avoid the bitter entrails and fat from adversely affecting the quality of the fish prior to salting.

The gutted fish is washed either with sea, lagoon or fresh water. Salting is done by loading the inside with salt crystals and covering the outside also with sufficient salt crystals. The fish are packed in layers in wooden barrels and the top most layer incompletely covered with another layer of salt crystals (Fig. 2). The top of the wood barrel is then covered completely with either old basins or jute and the product left for 1-3 days.

Drying then follows by removing the fish from the barrels and arranging them on either the

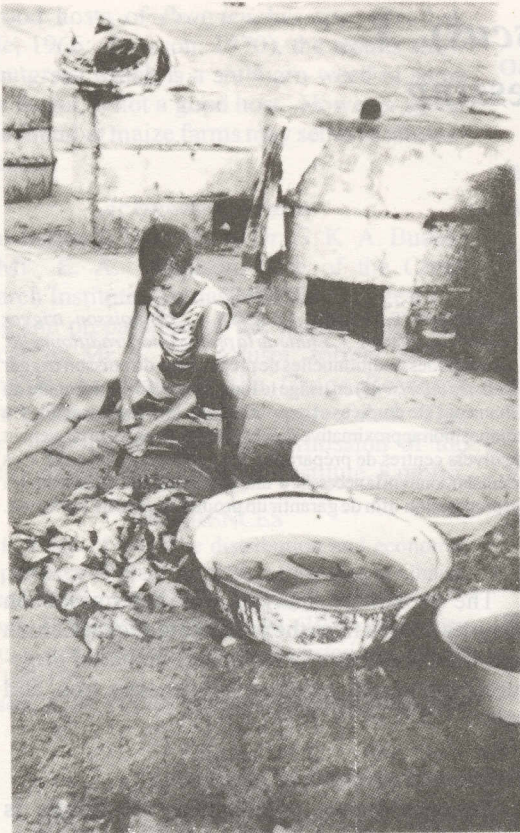


Fig. 1. Gutting at processing site.

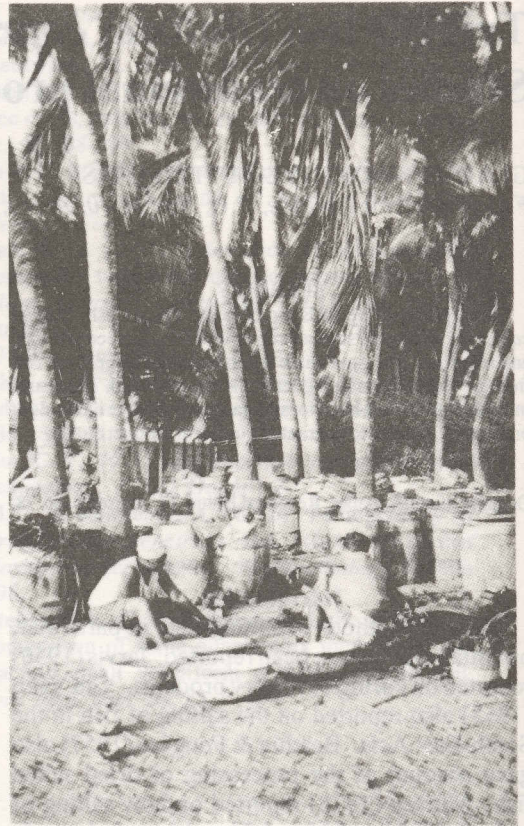


Fig. 2. Salted Trigger fish in barrels.

ground or on bamboo racks placed 0.6-0.9 m above ground. The rack is an improvement upon drying on the ground (Fig. 3, 4). A special feature of this operation is that in spreading the fish either over the racks or on the ground, all the heads of the fish are made to point to one direction (Fig. 3, 4). After about 6 h, the fish is turned over for the other side also to be exposed to the sun. Usually, the drying process continues for 3-5 days until the fish is seen to be dry. The salted dried fish is then packed into round cane baskets for distribution and sale (Fig. 5).

Chemical analysis

Forty whole salted dried Trigger fish were collected from woman X at Elmina over a period of time. Moisture and salt levels of each individual fish were determined.

On another occasion, 10 samples were collected from women A, B, C, D, E and again the salt and moisture levels determined on each individual fish.

The last batches of salted dried Trigger fish

with 10 whole fish in each batch were also obtained from nine processing sites at Elmina for proximate analysis.

The fish were all minced with a Hobart mincer (CE-100 Mixer, 10QT Model) after peeling off the tough skin by hand and removing the flesh from the bones and samples taken from the minced batch for the analyses.

Moisture. 5g of well minced sample was dried in an air drying oven at $105 \pm 1^\circ\text{C}$ to a constant weight. The difference between the weight of the wet and dry samples gave the moisture content.

Protein. The total nitrogen was determined on 2 g sample by the macro Kjeldahl method and the percentage protein calculated with a factor of 6.25.

Fat. Determined on a 5 g sample by continuous Soxhlet extraction for 8 h using petroleum ether BP 40-60 $^\circ\text{C}$.

Ash. Determined by heating 5 g sample in a silica crucible in a fumé cupboard to remove excess water and then ashing in an electric muffle furnace at 550 $^\circ\text{C}$.

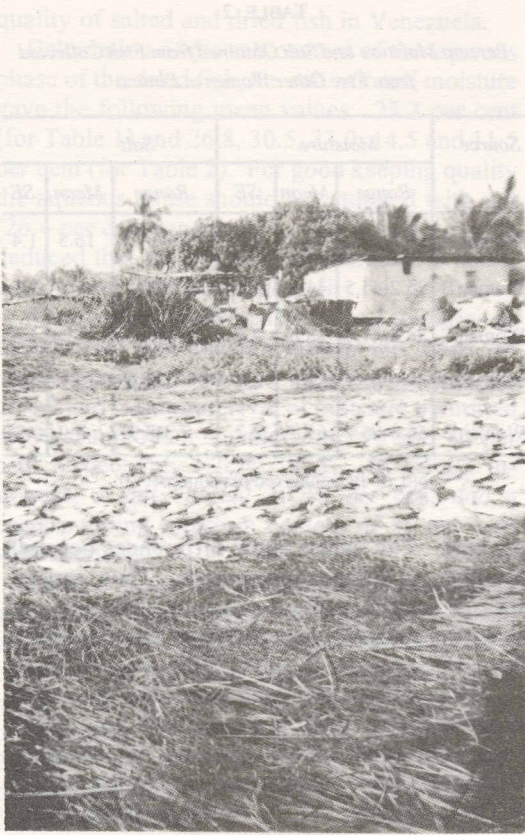


Fig. 3. Trigger fish drying on the ground.

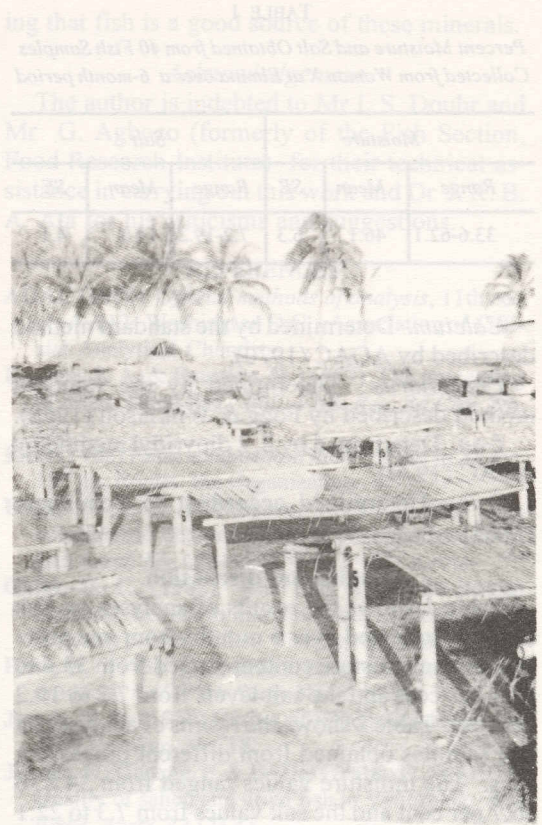


Fig. 4. Trigger fish drying on racks.



Fig. 5. Trigger fish packed into round cane baskets.

TABLE 1

Percent Moisture and Salt Obtained from 40 Fish Samples Collected from Woman X at Elmina over a 6-month period

Moisture			Salt		
Range	Mean	SE	Range	Mean	SE
33.6-62.1	46.1	6.3	7.2-19.2	14.0	4.1

Calcium. Determined by the standard method described by AOAC (1970).

Phosphorus. Determined by the standard method described by Fogg & Wilkinson (1958).

Iron. Determined by 2, 2 dipyridyl method by AOAC (1970).

Salt. Determined according to Schonherz (1955).

Results and discussion

Table 1 shows the results of analyses on fish samples collected over 6 months from one processor. The moisture content ranged from 33.6 to 62.1 per cent and the salt levels from 7.2 to 19.2 per cent. Table 2 shows the results of analyses on fish samples obtained from different processing sites. The moisture values ranged from 34.8 to 66.7 per cent and the salt values from 7.3 to 22.1

TABLE 2

Percent Moisture and Salt Obtained from Fish Collected from Five Other Women at Elmina

Source	Moisture			Salt		
	Range	Mean	SE	Range	Mean	SE
Woman A	39.5-49.2	45.0	2.9	13.4-17.3	16.5	1.4
Woman B	35.2-45.5	41.2	4.1	14.9-22.1	17.8	2.0
Woman C	34.8-41.4	38.6	2.4	16.7-21.3	19.3	1.5
Woman D	48.5-62.1	53.0	4.3	11.0-15.8	13.1	1.6
Woman E	56.8-66.7	61.7	2.7	7.3-8.9	8.0	0.55

No. of fish analysed per source = 10

per cent. The values show differences between products of different processors. Thus, processors D and E produce products with salt and moisture contents very different from products from processors A, B, and C. This may be a result of inadequate salting and poor drying. This suggests that a much more uniform and better-keeping product could be obtained by education. This observation was also made by Jorner, George & De Del Grallo (1971) whilst working on the

TABLE 3

Mean Proximate Composition of the Salted Trigger Fish (*Balistes capricus*) Samples from Elmina

Batch No.	Moisture (percent)	Protein (N x 6.25 (percent))	Fat (percent)	Ash (percent)	Iron (mg/100g)	Phosphorus (mg/100g)	Calcium (mg/100g)
1	40.5	34.7	1.1	26.6	9.0	835	634
2	37.9	39.6	2.1	20.2	4.4	864	629
3	40.5	37.8	1.6	18.2	3.0	581	348
4	36.9	39.2	1.4	25.4	-	-	-
5	39.3	39.2	1.3	18.5	5.6	673	468
6	39.2	37.5	1.7	19.3	4.7	817	564
7	38.1	39.5	1.8	18.3	5.9	727	455
8	39.2	36.5	1.4	21.6	5.9	-	315
9	39.8	35.5	2.6	19.8	5.2	868	573

quality of salted and dried fish in Venezuela.

Calculation of the salt content of the aqueous phase of the dried fish, i.e. salt/salt and moisture gave the following mean values: 23.3 per cent (for Table 1) and 26.8, 30.5, 33.0, 14.5 and 11.5 per cent (for Table 2). For good keeping quality the aqueous phase should be saturated with salt (26.4 per cent) or nearly so. From this it can be deduced that the products of operators D and E would have poor keeping quality.

Regulations prescribed by several countries on salted dried fish concern mainly the limits for moisture and salt contents. The minimum levels of salt and maximum level of moisture permitted in the Cambodian standards are 10 and 40 per cent respectively (Hess, 1953). In certain instances, a salt content of 15 per cent and a corresponding moisture content of 45 per cent were allowed.

Table 3 gives the proximate composition of samples of Trigger fish obtained randomly from nine processing sites at Elmina area. The values obtained did not show much variation. Mean moisture ranged from 36.9 to 40.5 per cent, protein from 34.7 to 39.6 per cent, fat from 1.1 to 2.6 per cent, ash from 18.2 to 26.6 per cent, phosphorus from 581 to 868 mg/100 g, calcium from 348 - 815 mg/100 g and iron 3.0 - 9.0 mg/100 g.

The values obtained for iron compare favourably with the range 3.6 - 8.0 mg/100 g reported in FAO (1968). With the relatively high values obtained for calcium, phosphorus and iron, salted dried Trigger fish confirms Guha (1962)'s find-

ing that fish is a good source of these minerals.

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